

Going Metric: a Lot Easier And Cheaper Than Expected

CINCINNATI

As American industry takes its first steps into the metric age, many companies are finding to their surprise that the shift does not bring the overwhelming expense that had been feared.

At a metric design seminar in this Ohio city, where a half dozen major corporations reported on their experiences, this is the picture that emerged:

- Sudden conversion of all product lines to metric measurements can be very costly in new machinery, tools and training. But a gradual shift as new models are phased in actually costs little more than would be spent normally in redesigning and retooling.

- Design engineers, in most cases, appear to welcome the change to millimeters and liters, away from inches and quarts. With everything divisible by 10, they find the system is easier to work with and often saves 5 to 10 per cent in design costs.

- New tools required are not proving to be as costly as had been predicted. Often the biggest single added cost is for a micrometer at \$15 or \$20, or a new set of metrically marked sockets at 75 cents each.

- Training, too, is less of a problem than was once anticipated. Instead of giving all employees a course in metrics, these companies give instruction on a need-to-know basis, and only on aspects related to specific jobs.

- Unexpected savings are cropping up. Typically, in redesigning to metric measurements, parts such as nuts and bolts must be changed a bit, which provides a chance to cut back on the number of standard types required.

The current status of the shift to metrics was outlined by the American National Metric Council, a cosponsor of the Cincinnati meeting along with the American Society of Mechanical Engineers. The ANMC reports:

"At this stage, a good majority of the larger U.S. firms already have set up organized planning units, put metric units on their designs, or redesigned at least one new model in metric, with the encouragement of the metric bill signed last December."

For a look at what is happening in six major corporations that reported on their experiences—

General Motors. The auto giant was so impressed by its experience with the all-metric Chevette that it now plans to redesign all of its middle and large mod-



Engineers at GM are taught the use of metric-oriented tools and measuring devices. Many firms are finding that metric training, if given on a need-to-know basis, may involve relatively few workers

els to the new system this autumn. Only the engines will still be inch-designed.

Said Everett Baugh, GM's official in charge of metric planning:

"When General Motors first analyzed the cost of going metric, in 1966, it was about as staggering as the national debt. In 1972, we restudied the cost based on going metric only with new models as they came out. That figure was just 28 per cent of the first estimate. In 1973, another study brought it down to 19 per cent. Now, practical experience suggests that the real cost will be only 4 per cent of the original estimate."

GM plans to go metric on all new projects, whenever a part or model needs to be redesigned. On that basis, officials say, metrication does not cost anything and eventually will lead to big savings.

The Chevette had been produced in Germany and was to be rushed into production in the U.S. in 18 months, using the German blueprints in metric.

As it turned out, all of the drawings had to be redone to conform with American engineering procedures. But Fisher Body, which builds the bodies for all GM cars, reported no problems in designing the new machinery to metric measurements and no increase in costs.

Plans to give all 700,000 workers on the Chevette a 12-hour course in metrics were dropped, because most were not dealing with measurements.

Some union officials had predicted that a set of tools calibrated in metrics might cost thousands of dollars for many skilled workers. The average outlay turned out to be \$50 to \$60.

Ford Motor Company. Ford is going metric on its new heavy construction machines. The Pinto is being produced as a hybrid, with a metric engine and rack-and-pinion

steering assembly. An all-metric heavy truck is in the design stage. All 1978 models are to be wholly metric in their design—or close to it.

Commented Stanley E. Mallen, Ford official in charge of metrics:

"We had no real problems in designing and producing an all-metric, four-cylinder engine for the Pinto. We didn't try to measure the added expense, because we thought that would cost more than the conversion itself."

Tools, Ford officials found, were an emotional issue—particularly for those highly skilled workers who provide most of their own. But in the metric-engine project, the biggest outlay for the majority was for a new set of 10 sockets at 75 cents each—a total of \$7.50.

Some minor problems cropped up. The new nuts and bolts look much like any others, so those for the Pinto are dyed blue—adding 4 per cent to their costs.

"Fasteners"—the thousands of nuts, bolts and screws used in making every car—still are not available in metric sizes "at a good price." Officials hope this will be self-correcting as demand for them rises.

John Deere. This major producer of farm and construction machinery reported to the Cincinnati meeting that it would go metric with all forthcoming new products and models. The company does not normally change models more than once every eight or 10 years, however, so it will not be moving as fast as the auto makers.

Deere officials are concentrating now on a new V-8 engine of all-metric design, for use in a variety of tractors and heavy construction machines.

The first step was a training program for engineers, who were given the met-

ric data in a four-hour course and told to finish the learning process on their own.

Shop people were found to be "very supportive" of the new project. They saw the transition from inches to millimeters as similar to the switch years ago from fractions to decimals.

Training of production workers turned out to be fairly simple. On a "need to know and when needed to know" basis, only 2,500 of the 12,000 employees on the project got any metric training.

The company, meanwhile, is making a "soft conversion" by producing exactly the same tractor engine in Dubuque, Ia., and in France, its measurements calibrated in inches in the U.S. plant and millimeters in Europe.

Parts, labeled both ways, are routinely exchanged between the French and American models.

The conclusion by a Deere executive: "We've had no real problems yet in converting to metrics, and we are gradually becoming bilingual."

Procter & Gamble. A major company that makes only products used in the home is trying another type of metrication—a shift to metrics in designing production machines for its own use, not for sale.

The reason, as explained by P&G official George Nassauer, is that the firm wants to "optimize profits" and foresees the time, fairly soon, when maintenance will be more costly for production machinery designed in inches.

In a pilot project, the concern is developing an all-metric machine with 14 separate operations for the production of diapers.

Design draftsmen, working on the complex new machine, found that it took longer to produce drawings in metric for the first two months, about the same time for the next four months, and less after that as they began "thinking metric."

The designers estimate that the shift actually reduced design cost by at least 5 per cent.

Massey-Ferguson. This worldwide manufacturer of industrial, farm and construction machinery has announced that all of its new model designs will be metric. Each of the company's three major divisions will set its own pace.

The tractor division, located in the U.S., recently introduced its new model, designed in inches and expected to have a 10-year run. Now the company is working on an all-metric tractor to be produced as the next model, possibly within the next eight years.

Massey-Ferguson's second division produces big industrial and construction machinery abroad in nations where designs are already metric. Thus, about 15

per cent of output now is in metric measurement.

The third M-F division is the Perkins plant in Britain, a large producer of diesel engines that has just presented its first all-metric diesel engine. Its other models will continue to be produced in inches.

Boeing Company. This aerospace firm is moving into full-scale metric machining with the Roland missile, originally developed in Europe. Some existing machines are being adapted and new tools with dual English-metric capability are

being ordered. Metric screws and gears will be used to retrofit some lathes.

Conversion of European drawings for Boeing's use has caused no major problems. One official reports: "Our workers picked it right up. We were a little surprised."

Not all major U.S. firms are in the "go" stage, and some are still holding back. But on the basis of experience reported at the Cincinnati meeting, this revolution in U.S. measurements appears to be taking hold faster than expected, and with less trauma.

WHEN YOU START "THINKING METRIC"— After the nation goes all-metric:



The 55-mph speed limit becomes 89 kilometers per hour.



A 10-mile trip into town will be 16 kilometers long.



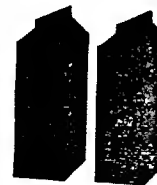
A man who is a 6-footer will be a 183-centimeter-er.



A 110-pound woman will weigh 50 kilograms.



A 1-gallon jug of milk will be a 3.8-liter jug.



A 1-quart bottle will hold .95 liters.



A freezing day of 32 degrees will become a 0-degree Celsius day.



A warm day of 80 degrees Fahrenheit will really be 27 degrees Celsius.



A 10-ounce steak will weigh 284 grams.



And first down and 10 to go will become first and 9.1 meters.